

REMARKS

Reconsideration and allowance in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 1-3 are pending in the application. By this Amendment, claims 1-3 are amended.

Claim Objections

Claims 1-3 are objected to as having no transitional phrases. Furthermore, the claimed equations in claim 1 are objected to as not clearly disclosing each variably clearly. Claim 1 is amended to at least add a transitional phrase to more clearly recite the claimed subject matter and place the application in better compliance with commonly accepted US patent practice.

In addition, claim 1 is amended to recite wherein l is an integer number and T_e is the sampling period. Furthermore, Applicants respectfully submit that claim 1, when viewed in light of the specification, reasonably set out and circumscribes, at page 5, line 14 – page 6, line 16, the particular subject matter. Accordingly, withdrawal of the objection is respectfully requested.

Claim Rejections

Claims 1-3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Based upon the amendments to the claims, this rejection is respectfully traversed. More specifically, the claimed "ICA-type method" is spelled out as Independent Component Analysis (ICA) - type method," construed as such by the Examiner.

Furthermore, Applicants respectfully submit that compliance with 35 U.S.C. 112, second paragraph, involves a determination of whether the claim apprises one of

ordinary skill in the art of the claim scope, i.e., whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Applicants believe that the unamended and amended claims reasonably set out and circumscribe the particular subject matter. Accordingly, withdrawal of the rejection is respectfully requested.

Claim Rejections under 35 U.S.C. 103(a)

Claims 1-3 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Thibault et al.* (US 6,240,098 B1) in view of *Dishman et al.* (US 2003/0204380 A1) and *Ling et al.* (US 2002/0122397 A1).

Thibault relates to a very specific system of communication, wherein the system of reception is multi-channel and the sending of the users is realized in a standardized way, with frames and bursts comprising known sequences.

Thibault appears to separate the users (or mobiles) in the base station in order to be able to communicate with a downward link (from the base station to the mobile) in the direction of the mobile, by making an electronic beam with the antenna network of the base station. One disclosed embodiment *appears* to consist of applying a blind algorithm for separating the source, the algorithm allowing the separation of users by estimating direction vectors. Knowing these direction vectors for each of the different users allows the signals of each user to be separated, using known algorithms for demodulating each of the users.

These known demodulating methods all require knowing information on the emitting signal, e.g., structure of the frame, and training sequence. The disclosed algorithms for demodulating are of the Decision Feedback Equalizer (DFE) type, which uses the knowledge of the factors (coefficients) of a spatio-temporal filter, (*see Thibault*, columns 20-21) to demodulate the signals.

Indeed, the passage, at column 21, 7-10, specifically states that “[a] fact common to all them is that they utilize the a priori knowledge,” and therefore suggests that the disclosed demodulation is based on *an priori* knowing and is not therefore totally blind.

With this system of communication it is possible to accept several users on the same slot TDMA-FDMA. Accordingly, that is why in this case the term used is SDMA (Space Division Multiple Access).

Based upon the above, Applicants respectfully submit that *Thibault* does not disclose, teach, or suggest blind demodulation, as recited in claim 1.

Applicants' claimed method is distinguished from *Thibault* in that Applicants' method relates to a method that executes a blind demodulation of only one user in a propagation channel with multi-paths that estimates the symbols of one user in a blind manner. Consequently, the process identifies "in a blind manner" the matrix of the channel (coefficients $h(k)$), the matrix connecting the received signals on the reception station and the symbols trains of the user. Consequently, the process estimates in a "blind manner" the train of symbols of a user without having a priori knowledge of the structure of the frame or a signal of reference.

The number of symbol trains is a function of time spreading of the channel and each train of symbol is the same signal train, but shifted by an integral number of symbol periods.

Thibault, at column 5, lines 9-12; column 6, lines 15-34; and column 6, lines 43-48 all indicate that *Thibault* use a priori knowledge of the sending signals, i.e., the structure of the frame, to separate the transmitters. Accordingly, as disclosed in column 12, lines 40+, *Thibault* using spatial information obtained within the frame to demodulate the received signals, and therefore fails to disclose totally blind demodulation of each transmitter.

The Applicants' application further distinguishes itself from *Thibault* in that Applicants calculates channel vector z . Because the equation is verified for $0 \leq j < l$, the process makes the following spatio-temporal approach (step I.3) from the observations $x(kT_e)$:

$$z(ml T_e) = \begin{bmatrix} x(ml T_e) \\ x(ml T_e + T_e) \\ \vdots \\ x(ml T_e + (l-1)T_e) \end{bmatrix} = \sum_{l=1}^{L_c} h_z(n(l)) a_{m-n(l)} + b_z(ml T_e) \text{ where } h_z(n) = \begin{bmatrix} h_{n,0} \\ h_{n,1} \\ \vdots \\ h_{n,L-1} \end{bmatrix} \quad (1)$$

wherein $h_{n,j} = h(nl T_e + jT_e)$ et $b_z(ml T_e) = [b(ml T_e)^T \dots b(ml T_e + (l-1)T_e)^T]^T$. Knowing that $x(t)$ has a dimension $N \times 1$, the vector $z(t)$ is of dimension $Nl \times 1$.

In addition, $h(k)$ is a vector which the $n^{ième}$ component is the $k^{ième}$ coefficient of the filter, the filter filtering linearly the train of symbol $\{a_m\}$ on the $n^{ième}$ sensor. The filter of the vectorial $h(k)^1$ depends on the filter of bringing in shape and of the propagation channel.

In order to extract the L_c trains of symbols $\{a_{m-i}\}$ of interest (number of symbols that participates at the IES), the process samples the received signal with $l = (2L_0 + 1)$, by supposing that $P \leq N$.

Knowing that the filter NRZ verifies that $2L_0 + 1 = 1$ and the Nyquist filter $2L_0 + 1 = 3$ for a roll-off of 0.25, the train of the symbols can be extracted for these two shaping in shape filter respectively when $P < Nl$ et $3P < Nl$.

The vector of observations $z(t)$ being determined, the process applies a method of ICA type so as to estimate L_c "trains" of symbols $\{a_{m-i}\}$ associated to the vectors of channel $\hat{h}_{z,j} = \hat{h}_z(k_j)$.

Thibault does not disclose, teach, or suggest this method.

Applicants further submit that *Dishman*, in claim 1 and paragraph [0018], appears to only relate to a method for separating in a blind manner several signals from several sources, using a separation matrix that is function of temporal differences between the instant of reception of the different signals and an order fourth function. Therefore, Applicants respectfully submit that *Dishman* fails to remedy the deficiencies of *Thibault*.

¹ Coefficient of the matrix of the channel.

Similarly, *Ling* appears to only relate to a method and apparatus for performing closed loop power forward link power control and likewise fails to disclose blind demodulation, as recited in claim 1.

Therefore, Applicants respectfully submit that claim 1 is patentable at least due to the failure of the combination of applied references to disclose, teach or motivate all recited features of the claims. Claims 2-4 depend from this independent claim and are likewise patentable over the asserted combination of references for at least their dependence on an allowable base claim, as well as for the additional features they recite. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

All objections and rejections having been addressed, it is respectfully submitted that the present application should be in condition for allowance and a Notice to that effect is earnestly solicited.

Early issuance of a Notice of Allowance is courteously solicited.

The Examiner is invited to telephone the undersigned attorney of record to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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